BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
Wireless E911 Location Accuracy Requirements	)	PS Docket No. 07-114
	)	
Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems	)	CC Docket No. 94-102
	)	
Association of Public-Safety Communications Officials-International, Inc. Request for Declaratory Ruling	)	
	)	
911 Requirements for IP-Enabled Service Providers	)	WC Docket NO. 05-196
	)	

To: The Commission

COMMENTS OF THE KING COUNTY E911 PROGRAM

I. INTRODUCTION

The King County E911 Program provides these comments regarding the above captioned matters addressed in the Notice of Proposed Rulemaking, FCC 07-108, adopted by the Commission on May 31, 2007.

King County is the largest county in Washington State with a population of 1.8 million people. The county includes the large urban city of Seattle, as well as suburban, rural, and mountainous areas. Enhanced 911 (E911) service is provided to the public through 13 Public Safety Answering Points (PSAPs). The percentage

of 911 calls coming from wireless phones has steadily increased over the years. Of the 2.2 million 911 calls answered by the PSAPs in 2006, 60% of the calls were made from wireless phones, and 40% were made from wireline phones. Although VoIP 911 calls made up only .2% of the total call volume, the number of VoIP 911 calls grew by 600% in 2006.

King County implemented Phase II wireless E911 service with the seven wireless carriers who offered service within the county in 2003. It soon became apparent that there were several variables to Phase II service, and that the service did not meet the expectations of the PSAPs. Each carrier's service was different, and had its own unique characteristics. For some carriers, the 911 call was delivered as a Phase I call, and required that the PSAP do a rebid to obtain the Phase II location. Other carriers delivered the call with Phase II, and for other carriers, calls could be delivered as either Phase I or Phase II. Some carriers' systems required the PSAP to wait at least 15 seconds before doing a rebid, while for other carriers an immediate rebid was possible. The accuracy of the locations provided differed tremendously between individual carriers, and between network and handset carriers. On many of the calls from handset carriers, the audio link with the carrier was lost for several seconds on the initial call and on each rebid.

Due to these many variables, it became necessary to create a chart that is kept at the PSAP call answering positions that explains the characteristics of each carrier's Phase II service, so the call takers know how to appropriately respond to calls from each individual carrier. The loss of audio problem has become so

disruptive to communicating with callers, with the audio being blocked on some calls for up to one minute, that many callers get confused and hang up. As a result, the PSAPs have discontinued doing rebids for Phase II location unless it is absolutely necessary because the caller is unable to communicate. Retaining voice connection with the caller is the most critical factor, and the PSAPs have chosen to sacrifice the benefits of Phase II in order to make that possible.

The PSAPs have struggled with trying to locate callers using highly inaccurate Phase II locations. In order to inform the PSAPs on how much confidence to place in the locations, the carriers were requested to provide accuracy statistics. None of the carriers were willing to share the results of their accuracy testing.

II. KING COUNTY RESPONSES TO NPRM QUESTIONS

The following comments are submitted in response to specific questions asked by the Commission in this proceeding.

King County Phase II Accuracy Testing Results

Due to the high inaccuracy of Phase II locations on the majority of calls, and the wide variance in accuracy between carriers, King County implemented a Phase II Accuracy Testing Program in 2005. King County has contracted with Wireless Infrastructure Technology Services (WITS) Corporation to conduct this testing. The accuracy of locations provided by each carrier is tested every six months. The testing is done countywide, and includes all five Wireless PSAP areas. The testing methodology is based on OET Bulletin No. 71, ESIF's Technical Report on High

Level Requirements for Accuracy Testing Methodologies, and the CDMA Development Group's CDG Test Plan Document for Location Determination Technologies Evaluation. The results of the testing are used to educate the PSAPs on how much they can rely on the Phase II locations provided by each carrier.

Since this program was implemented, five testing cycles have been completed. The testing results are as follows:

- On a countywide basis, only one carrier, which uses a handset-based location technology, has met the FCC accuracy requirements for 67% and 95% of their calls in all five test cycles.
  - This carrier also met the accuracy requirements in the individual PSAP areas most of the time. On 67% of their calls, the locations were within 16 – 22 meters, and 95% of their calls were located within 40 – 102 meters.
- All of the handset-based carriers met the 67% accuracy requirement on a countywide basis, with locations between 23 – 49 meters. With the exception of the one carrier noted above, the other handset-based carriers generally did not meet the 95% requirement, with their locations falling between 406 – 2,482 meters (.25 – 1.5 miles).
  - These carriers met the 67% requirement in most individual PSAP areas with locations between 18 – 131 meters, although one carrier missed the requirement with locations of 200 – 2,482 meters. These carriers missed the 95% requirement most of the time, with locations

at several thousand meters up to 10,037 meters, which is over 6 miles off.

- On a countywide basis, all of the network-based location technology carriers missed the 67% accuracy requirement all five test cycles, with locations between 101 – 264 meters. All of these carriers also missed the 95% requirement, with locations between 1,315 – 4,116 meters (.8 – over 2.5 miles).
  - In the individual PSAP areas, the network-based carriers only met the 67% requirement 4% of the time, with locations between 103 – 1,690 meters, and fairly significant inconsistencies in accuracy in the different PSAP areas. These carriers only met the 95% requirement 1% of the time, with locations between 450 – 17,055 meters (over 10 miles). There were definite inconsistencies in accuracy between PSAP areas.
- As part of the testing, the percentage of test calls that were able to deliver a Phase II location fix to the PSAP, on the initial call or with one rebid, was also tracked.
  - For the handset-based carriers, fixes were achieved on 50 – 96% of the test calls.
  - For the network-based carriers, fixes were achieved on 42 – 100% of the test calls.

Paragraph 5

The testing results have generally paralleled the PSAPs' experiences with real 911 calls. The PSAPs have reported that they feel somewhat confident with the locations provided by the one carrier who consistently meets the FCC accuracy requirements. Most of the Phase II locations provided by the other carriers are so inaccurate that they are unusable, especially the network-based technology solutions. Both the PSAPs' experiences with attempting to locate 911 callers based on the locations provided and the testing results clearly illustrate that improvements are needed in the technologies the wireless carriers are using to locate their customers who call 911. In addition, the PSAPs' experiences and the testing results demonstrate that the wireless carriers should be required to meet the accuracy requirements at either a regional 911 authority or PSAP level. In Washington State, E911 systems are established on a countywide basis, so the regional 911 authority scenario would fit well within the state.

In addition, the PSAPs' experiences and the testing have demonstrated that Phase II locations are not provided on a significant number of calls. There are wide variances in the percentage of Phase II fixes provided, so the PSAPs cannot routinely depend on a Phase II location being available on 911 calls. There should be reliability standards to require a higher percentage of location fixes.

The public expects that when they call 911 from their wireless phone, the PSAP can pinpoint their location and send help. The current situation is very dangerous, because the reality of the quality of Phase II service that is currently provided is not even close to this perception.

Paragraphs 6 and 8

Given the magnitude of problems and the serious flaws in the location determination technologies that are currently deployed, it will take some time for new technologies to be developed and deployed. There is a need to set an enforcement schedule that makes progress toward improving the accuracy of locations while allowing the carriers sufficient time to develop and deploy the new technologies. There should be benchmarks set in the schedule, to ensure that all carriers are actively working on the improvements to their systems. These benchmarks could be related to the steps of technology development, deployment of the new technology, and the establishment of an accuracy testing program at the PSAP level.

Paragraphs 9 and 10

We strongly agree that a single location accuracy standard should be established. As noted in the Introduction, there are such wide variances in the performance of the location technologies used by the carriers today that a chart had to be developed for use at the call answering positions in order to note the differences. It is too confusing for the PSAPs to have to track the specific unique characteristics of each carriers' technology. There are huge variances in the accuracy of locations, with some carriers locating callers to within 15 meters and other carriers'locations being over 17,000 meters off. There should be one standard that all carriers are required to meet, and the carriers should use the most highly accurate technologies available in order to meet the standard.

Just as it is too complex for the PSAPs to track the variances in the performance of the location technologies, the public also cannot be expected to understand the differences. They have the expectation that when they call 911, their location is provided and the PSAP can find them. A very dangerous situation exists today with the reality of the performance of the location technologies being so far off from the public's expectations of 911 service.

Paragraph 11

Our testing has not shown any validity to the claim that the handset-based solutions don't work in urban settings. These technologies performed just as well in downtown Seattle between the tall skyscrapers as they did in the rural areas. Conversely, the network-based solutions had no better performance in Seattle than elsewhere. Our testing does not include in-building test sites, and we recognize that there are challenges with the handset-based technologies locating callers within buildings, and this will need to be addressed in the technology development.

Our test results do not support the implementation of hybrid solutions that are both handset and network based, since the network solutions in use today did not universally have better success in locating higher percentages of callers than the handset solutions.

Paragraph 12 and 13

We agree that there should be more stringent requirements for location accuracy than the requirements that are in place today. The current

requirements provide the general area, not the specific location, of the caller. As many people are giving up their traditional wireline phone and using their wireless phone as their only phone, there is a greater need to pinpoint the location of 911 callers to individual addresses, apartment units, or office suites. King County studied this issue several years ago, prior to the establishment of the current Phase II requirements, and determined that in order for the PSAPs to be able to reliably locate 911 callers at the single address level, they would need locations within 40 feet, or about 12 meters. While this accuracy requirement may be too stringent initially, this is the goal we should work toward if 911 caller locations are going to be truly useful to the PSAPs.

We agree that elevation is important, and should be included in the standard. Our PSAPs deal with 911 calls coming from tall skyscrapers and mountains, and elevation is a critical element to quickly locating these callers.

Specific requirements for the percentage of calls that are located should be added. With some of today's technologies only locating 42% of callers, having high accuracy requirements without requirements to locate high percentages of callers will not result in improvements to service.

All classes of carriers who provide wireless 911 service to the public should be required to meet a single, universal standard. Having multiple standards will continue to create confusion for the PSAPs and the public.

The timeframe to require the more stringent accuracy will need to allow the carriers a reasonable amount of time to accomplish all of the work necessary to

develop and implement the new technologies, while at the same time recognizing the urgency to fix the current situation, which jeopardizes the lives of people every day. Our testing has shown that only one carrier is meeting the current accuracy requirements. The other carriers' existing location technologies do not meet the existing requirements. It is apparent that these carriers will need to make significant changes to their location determination systems in order to meet the current or more stringent requirements. It appears that most carriers will be at equal starting points regarding the need to improve or replace their existing technologies.

Paragraph 14

The testing methodology used in King County's Phase II Accuracy Testing program is based on OET Bulletin No. 71, ESIF's Technical Report on High Level Requirements for Accuracy Testing Methodologies, and the CDMA Development Group's CDG Test Plan Document for Location Determination Technologies Evaluation. The testing environments were developed using the CDG Test Plan scenarios. Specific test call locations which represent these environments were identified. The locations of actual 911 calls were analyzed, and the percentage of test points reflective of these environments is representative of the environments the real 911 calls throughout King County were made from. These environments include commercial and industrial areas, residential, dense urban, rural, highways, and waterfront. A total of 47 test call

locations are used in each testing cycle. One handset for each carrier is used, and ten test calls per handset are made from each location. This testing program has been successful in that the testing results have mirrored the experiences of the PSAPs with real 911 calls, so it appears that the testing guidelines specified in these documents would be an appropriate basis for the new accuracy testing requirements.

The King County testing does not currently include indoor testing, although this is being considered. Since a high percentage of real 911 calls are made indoors, especially as people have replaced their traditional wireline phone with their wireless phone, it would be appropriate to require indoor testing. Requirements for the various scenarios for outdoor testing should be representative of the locations of the real 911 calls in the test area. This approach has been used successfully in King County for the past three years.

It would be best if the testing could be accomplished within the wireless carrier networks, without the need to deliver test calls to the live PSAPs. Since our testing program has been conducted independently and without carrier participation, it has been necessary to send our test calls to the PSAPs. Since Phase I and Phase II were deployed, the carriers are constantly testing their systems and driving test calls to the PSAPs. With multiple carriers offering service in King County, this has been extremely disruptive to the PSAPs, and has actually interfered with their ability to answer the real 911 calls. It would be very beneficial if the carriers would develop accuracy testing processes, and

methods for other types of testing needed for network maintenance, that can be conducted within their systems, and do not require test calls to be completed at the PSAPs.

Paragraph 15 and 16

We feel that it would be appropriate for accuracy testing to be required on an annual basis. The carriers are constantly upgrading or making changes to their networks, which potentially could affect their location determination systems, so it would be appropriate to reassess their accuracy once per year.

It would be appropriate for the accuracy testing results to be filed with the Commission, and provided directly to the regional 911 authority or PSAP whose area has been tested. It is critical for the PSAPs to understand the accuracy of the locations being provided on the real 911 calls, so they know how to appropriately respond to the calls.

When Phase II was deployed, the PSAPs had the impression that confidence and uncertainty would be provided on each 911 call, so they could assess how much to rely on the location. This information has either not been delivered or has been meaningless, due to the lack of a national definition of these factors and limitations in the E911 system's ability to present the information to the PSAPs. It would be very beneficial for these factors to be defined and delivered to the PSAPs with each 911 call.

Paragraph 17

The new location determination technologies that are developed and deployed

should follow national standards that allow them to interface with all carriers' systems. It is critical that 911 calls from wireless phones can be processed by any wireless network, as the public expects that their 911 calls will be able to reach a PSAP regardless of whether they are within their home network or not.

However, there are problems related to this requirement with the current system. 911 calls from non-initialized phones continue to cause constant, daily problems for the PSAPs. Many of these calls do not include locations or other important Phase II information, so the PSAPs are left with attempting to provide service to these callers without any tools to work with. These calls take longer to process, and if the call is disconnected, the PSAP has no information to use to call the phone back. Another problem is nuisance calls from children. People do not understand that even though they have discontinued service to their old phone, it can still call 911, and that is what happens when they give the phone to their children as a toy. Due to these significant problems, we encourage the Commission to reconsider whether wireless phones with no service should be able to call 911.

Another issue that has caused much confusion for the public is the fact that their wireless phones lock in emergency mode after placing a 911 call, as a result of the requirement for 911 calls to roam to any available wireless network. There is no consistency is how different phones behave when locked, or in the processes to unlock the phones. People do not understand why they cannot use their phone to make other calls after making a 911 call. This has caused serious

problems in some emergency situations, especially when the 911 call did not successfully reach a PSAP, and the caller has no ability to call alternative numbers. While it is critical that 911 calls are delivered to a PSAP regardless of which carrier's network the phone actually belongs to, it is also critical to resolve the locking in emergency mode issue, because it is too confusing for the public to be educated on this issue, and it jeopardizes the well-being of the 911 caller to not be able to place any other calls from their phone once they have called 911.

Paragraph 18

Providers of all telephone service to the public, regardless of technology, should have to follow the same requirements of providing accurate locations on 911 calls. In many ways, VoIP service is closer to wireline than wireless service. In these cases, VoIP providers should be required to provide actual address information to the PSAPs according to the same 911 standards as wireline phones. If the VoIP phone is mobile, the provider should be required to follow the same standards as the wireless carriers.

Again, this comes down to the issue of public expectations of service. They do not understand the differences in the technologies used to provide telecommunications services. They expect 911 to work the same regardless of the phone they use to make the call, and part of that expectation is that the PSAP will know their exact location.

III. CONCLUSION

We would like to thank the Commission for your continued support of E911 service, as shown by the rules you have established in this proceeding. Your work in E911 has resulted in great strides being taken in Washington State and throughout the nation on the deployment of E911 service for wireline, wireless, and VoIP phone users. Your actions in this proceeding will result in great improvements in the quality of wireless 911 service provided to the public. We respectfully encourage the Commission to require the wireless carriers to meet the accuracy requirements at either a regional 911 authority or PSAP level. The public has come to rely on wireless service for quick, easy access to emergency services, and it is critical that improvements in the quality of this service be made as quickly as possible.

Respectfully submitted,

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